

GUERRILLA SCIENCE MIXES SCIENCE WITH ART, MUSIC AND PLAY



Guerilla Science physics presenter Steve Mould displaying the shapes of sound waves with a Reuben's tube, London 2010.

By Mark Rosin, US director of Guerilla Science

Guerilla Science is an independent, non-profit organization that brings science to unusual venues like arts and music festivals. The goal is to reach audiences who have little or no scientific background. By bringing scientists and their ideas into the sort of environments where people least expect to encounter them—the traditional platforms for art, music, theater and dance—Guerilla Science aims to inspire new perspectives on science. Through “science by stealth,” we aim to educate as well as entertain, and target people who may be unfamiliar with (or even hostile towards) “science.” By blending science with art, music and play in unconventional ways in unconventional places, Guerilla Science provides a unique opportunity to further the public outreach with science in a new and inspiring way.

A new way for science outreach

In 2011, Guerilla Science staged its first event in the US as part of the music festival Escape2NY in Southhampton, New York. Produced by Dr. Mark Rosin, one of the founders of Guerilla Science and a postdoc in the Visiting Scientist Program at LLNL, and Olivia Koski, a laser weapons developer turned science communicator, the Guerilla Science team programmed three days of speakers, demonstrations and performances. These included a lecture by cognitive neuroscientist Prof. David Carmel of NYU on optical illusions, a talk on astrobiology by Andrew Brown, a guide to our galaxy with astronomer Neil Zimmerman, an exploration of the science behind circus daredevil feats, a crash course in first year college physics, an introduction to rogue taxidermy, and a neuroscientific guide to the evolution of music.

GUERRILLA SCIENCE, CONTINUED



Guerilla Science produced a gigantic brain as part of our interactive synesthesia game.

Since then, the Guerilla Science team has continued to push boundaries of science engagement in America by hosting an Intergalactic Travel Bureau at the Figment Art Festival and a laser display exploring DNA at a warehouse party in an old Pfizer factory. Next week Guerilla Science launches on the West Coast with a NASA sponsored event at an Oakland middle school.

Building on five years of success in the UK

Guerilla Science is linked to an existing project in the United Kingdom. Since 2007 Guerilla Science has acquired over \$175,000 in funding, involved more than 100 collaborators, and engaged with 11,000 members of the public. On www.guerillascience.co.uk one can find the full archive of programs, photos, blog posts, and a series of short videos. We have received media coverage

in Wired, Getty Images, Scientific American, New Scientist, The Guardian, The Sunday Times, The Telegraph, Q magazine, the London Times, and have even appeared on Russian television.

"I've done popular science presentations before, but always at events that were specifically about science. At first I was worried that the audience, who were all there for a music festival, might not be interested—so it was great to see that there was a lot of interest. It was especially good to see that people could relate to the things I spend my days doing, and genuinely thought they were cool."

Prof. David Carmel, NYU

Our belief is that science should be consumed as a form of culture throughout our lives with curiosity and pleasure, just as it is pervasively understood for the arts. But whereas one may cease to study music after childhood, yet still continue to enjoy music throughout one's life, scientific education is often abandoned altogether following school. The goal of Guerilla Science therefore is to encourage the informal pursuit of scientific education throughout adulthood: after attending one of our events, the hope is that many people will have acquired a heightened interest in the sciences and their relevance to everyday life.

Based on an article originally written by Zoe Cormier, Guerilla Science Director of Communication.

Parties or individuals interested in contributing or supporting the organization should contact Mark Rosin: mark@guerillascience.co.uk.



An excited audience enjoys a rap battle in which contestants, by being attached to vital statistics monitors, explore the physiology and psychology of performance stress.

CAREER RESOURCES

UPCOMING EVENTS

Lightning Talks

October 18th, 12-1 pm

B543, Grand Canyon Room

Lightning Talks are open-to-anyone, open-to-anything rounds of five minute talks. If you would like to present a Lightning Talk, just email the topic to Charles Reid (reid24@llnl.gov). Or if you'd just like to see what this is all about, all you have to do is show up! This is a great opportunity to explore and communicate any topic in which you have interest and would like to share. Lightning Talks will be followed by a one hour coffee break, sponsored by the LLPA, which will be a great time for networking and socialization with other researchers at the Lab.

MEASURING UP



Hiring committees and grant reviewers are often confronted with the monumental task of evaluating hundreds of applications and proposals, attempting to pick out that one special individual with the potential to accomplish great science. These evaluators are increasingly turning to defined metrics, such as h-index (based on number of publications and citations), to quickly judge an investigator's contributions. While this is a rapid evaluation tool, there is concern that this may not provide an accurate indication of a young investigator's potential.

A recent [paper in Nature](#) used machine-learning techniques to create a metric predictive of *future* success and potential based on a few simple inputs. You can try out your own future h-index [here](#). An [editorial commentary](#) suggests that this forward looking approach may help those still in the early stages of their careers. Despite the potential utility of metrics, however, no one wants their entire scientific existence boiled down to one number. Although these metrics may be useful for screening out some biases that may exist, it is likely that rigorous peer-review will remain the most reliable method of evaluation.

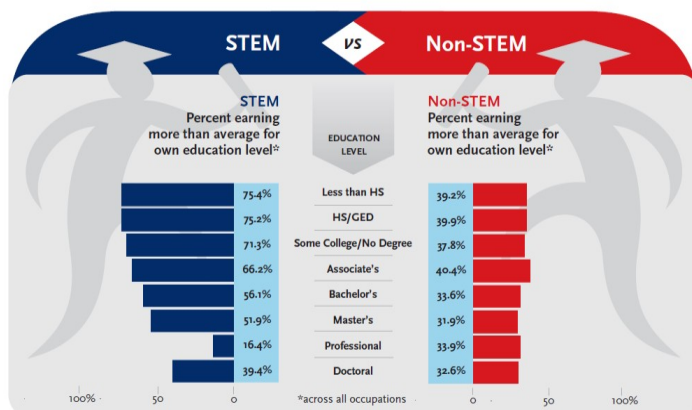
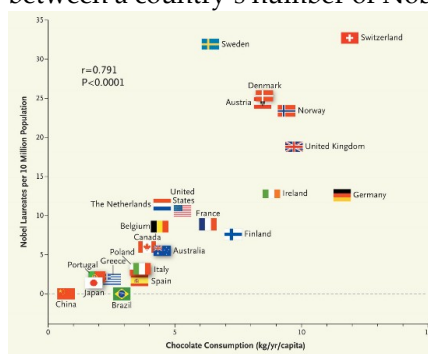


Figure from the [Georgetown University report](#), STEM: Science, Technology, Engineering, and Mathematics, illustrating wage potential for STEM graduates.

If you're like me, you spent most of the week in bitter disappointment that the Nobel committee once again passed over your ground-breaking research on how to simultaneously type emails and eat cup-o-noodles. Well, fortunately we all have an airtight solution for next year. The [New England Journal of Medicine](#) recently published a study indicating a strong correlation between a country's number of Nobel Laureates and corresponding chocolate consumption. So if you need me I'll be in my office with a pound of Hershey bars, waiting for Stockholm to call.

-Nick Be



JOB LINKS

Science – Featured jobs:

<http://scjobs.sciencemag.org/featured-jobs/>

Nature – Jobs of the week:

<http://www.nature.com/naturejobs/science/>

Official LLNL jobs site: careers.llnl.gov

Postdoc listings: www.postdocjobs.com

Academic jobs: www.academickeys.com

Careers in Physics: www.aps.org/careers

Government jobs: www.usajobs.gov/

Industry jobs: www.indeed.com

<http://jobs.newscientist.com/>

sfbay.craigslist.org/sci/

www.linkedin.com/jobs

POSTDOC HIGHLIGHTS: NOTES TO THE DIRECTOR

Cobalt-hydroxide catalyst research on inside cover of *Chemistry* The inside cover of the August 20 issue of *Chemistry, A European Journal* features a paper by LLNL researchers **Stephen Harley** (postdoc) and Harris Mason, and their UC Davis collaborators Gregory McAlpin, David Britt, and William Casey, on the chemistry of a cobalt-hydroxide (CoPi) water-oxidation catalyst. CoPi can be deposited on electrode surfaces, has high activity under benign conditions, and has the ability to undergo repair upon cycling between applied and open circuit potentials, making it a particularly attractive candidate for the development of catalyst-functionalized photo-electrodes that drive direct water oxidation upon exposure to light. Until now, there has been debate about the chemical structure of this material, particularly whether phosphate ions bond directly to cobalt sites (previous data suggests that there is not extensive Co-PO₄ bonding). Harley and collaborators report new ³¹P NMR data that support the idea that most phosphate ions are mobile in the interlayer region between the metal-hydroxide layers and interact with non-bonded Co(II) arranged in “sheets” or layers in the material. The results are consistent with the idea that CoPi resembles a layered-double-hydroxide mineral, in which variable-charge metal-hydroxide sheets are separated by a hydrous interlayer region containing mobile ions. The reversible oxidation of metals in the sheets is compensated by rapid proton transfers to pH-buffering ions, such as phosphates, in the interlayer region. These findings, which could lead to further optimization of this class of catalysts, were also highlighted in the international edition of the journal, *Angewandte Chemie*.



Nanographene materials featured on the cover of *Advanced Materials*

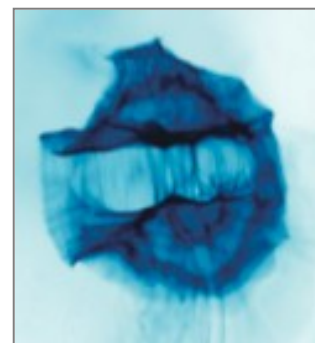
Juergen Biener and the team of LLNL and international colleagues describe nanoscale graphene materials in a paper featured on the cover of the September 25 issue of *Advanced Materials*. The article describes a strategy to fabricate mass-producible graphene-based bulk materials from low-cost polymer-derived carbon foams through the controlled removal of carbon atoms from a network composed of both amorphous carbon and graphite nanoplatelets. This approach is inherently inexpensive, scalable, and yields mechanically robust, centimeter-sized monolithic samples that are composed almost entirely of interconnected networks of single-layer graphene nanoplatelets. The specific surface area of this 3-dimensional nanographene bulk material is comparable to that of a free-standing graphene layer, but it has an open porosity that allows rapid mass transport through the material. Despite its high surface area, the material has a relatively high density (~ 200 kg/m³), which makes the material surprisingly robust. The material could therefore be used as an electrically activated actuator because the length of a 3-D nanographene electrode changes as much as ±2.2% as an applied voltage is cycled between ±1.0 V, and this change is reversible over many cycles. The LLNL authors are Juergen Biener, Marcus Worsley, postdoc **Arne Wittstock**, Jonathan Lee, Monika Biener, Christine Orme, Sergei Kucheyev, Brandon Wood, Trevor Willey, Alex Hamza and Theodore Baumann. Additional colleagues are from the Karlsruhe Institute of Technology, Technische Universität Darmstadt, and Technische Universität Hamburg-Harburg.



Self-organization in laboratory-based plasmas in *Nature Physics* New insights into

POSTDOC HIGHLIGHTS: NOTES TO THE DIRECTOR

the emergence of highly organized structures from the random motion of particles were reported by LLNL researchers and their collaborators in a *Nature Physics* article published online on September 30. The researchers said their discovery of self-organized electromagnetic fields in counter-streaming plasmas during experiments at the OMEGA Laser Facility at the University of Rochester will give scientists a new way to explore how order emerges from chaos in the cosmos. Studying astrophysics with laboratory experiments can help answer questions about astrophysical objects that are far beyond the reach of direct measurements. (Pictured here: two plasmas stream from the top and bottom to form large-scale fields image by short pulsed laser generated proton beams.) In their article, the researchers described a new model for exploring how electromagnetic fields help organize ionized gas or plasma in astrophysical settings, such as in the plasma flows that emerge from young stars. "These fields help shape the flows and likely play a supporting role alongside gravity in the formation of solar systems, which can eventually lead to the creation of planets like the Earth," said lead author postdoc **Nathan Kugland**. Added team leader Hye-Sook Park: "This observation was completely unexpected, since the plasmas move so quickly that they should freely stream past each other. Laser-driven plasma experiments can study the microphysics of plasma interaction and structure formation under controlled conditions." The research is part of a large international collaboration, *Astrophysical Collisionless Shock Experiments with Lasers (ACSEL)*, led by LLNL, Princeton University, Osaka University, and Oxford University, with many other universities participating.



NOTES FROM THE LLPA COUNCIL MEETING ON OCTOBER 3

Start: 10/ 3/ 2012, 12pm, B123 Conf. Room A.
Participants: Nathan, Theresa, Ryan, Kris, Charles, Heather, Nick, Andre

Introduction:

- * still \$240 available
- * two new people showed up, we will need to keep them and add more
- * Moderation of the mailing list: implementation difficult and stuck at the moment (Christine working on it)

Social Events:

- * Corn maze: date near end of October, most likely haunted maze, follow up with David A. (Nathan)
- * Brighter holidays: Nathan will check who coordinates brighter holidays this year

Newsletter:

- * Nathan wants to step down as the editor soon, we need replacement! (Note: Charles Reid is the new editor)
- * Volunteers please contact Nathan; teamwork possible!
- * effort: a couple of hours per newsletter
- * Nathan will send out an email to find volunteers
- * we still need feature articles
- * Audio recorder is on order

New buildings at the Lab:

- * Heather presented different concepts for cubicles, collaboration areas, etc. that are being discussed at the moment for new buildings
- * everyone discussed pro's and con's of those
- * main goal: fostering collaboration
- * Heather gathered feedback and will pass it on to senior management

Web Team:

- * Charles and Abhinav are currently collecting information for the web site (contacted different people for input)
- * technical implementation: Twitter bootstrap approach
- * collect questions for a FAQ area (Abhinav, Kris)

Brown bags:

- * Amy is trying to coordinate the PG&E brown bag
- * LDRD brown bag coming up soon
- * Brown bag with a panel of proposal reviewers coming up soon

Stanford visit:

- * Andre will collect input from Postdocs

Coffee break:

- * provide snacks (Cookies, Guac+Chips, Fruit, etc, ...)

SELECTED RECENT POSTDOC RESEARCH PUBLICATIONS

Bold = LLNL Postdoc. *Broadcast your achievements! Make new connections & help show how we are doing collectively.*

Guidelines: 1) Peer-reviewed and accepted publications (journal or conference proceedings) only; 2) Your affiliation must be LLNL; 3) Prepare a standard-format citation with all authors (no *et al*), the full title, journal/proceedings info, and a link to the online abstract; 4) Note which authors are LLNL postdocs, and in what division & group; 5) Send all of this to Nathan (kugland1@llnl.gov).

Chemical Sciences Division/Extreme Chemistry Group: S. Sharifzadeh, **I. Tamblyn**, P. Doak, P.T. Darancet, and J.B. Neaton, "Quantitative molecular orbital energies within a G_0W_0 approximation", *Eur. Phys. J. B* 85: 323, (2012)

<http://link.springer.com/article/10.1140/epjb/e2012-30206-0>

PLS/AEED/Program for Climate Model Diagnosis and Intercomparison:

Ma, H.-Y., S. Xie, J. S. Boyle, S. A. Klein, and Y. Zhang, "Metrics and diagnostics for precipitation-related processes in climate model short-range hindcasts," *J. Climate* (2012). <http://dx.doi.org/10.1175/JCLI-D-12-00235.1>.

Ma, H.-Y., H. Xiao, C. R. Mechoso, and Y. Xue, "Sensitivity of global tropical climate to land surface processes: Mean state and interannual variability," *J. Climate* (2012) <http://dx.doi.org/10.1175/JCLI-D-12-00142.1>.

COMMENTS/SUGGESTIONS/PRAISE/COMPLAINTS?

Please send your feedback to the Editor (Nathan Kugland, kugland1@llnl.gov).

LLNL POSTDOC ASSOCIATION LEADERSHIP COUNCIL

President Nathan Kugland

Vice President Andre Schleife

Newsletter Team

Nick Be, David Martinez, David Alessi, Nathan Kugland

Web Team: Abhinav Bhatele, Charles Reid

Social Events Team: Kirsten Howley, Andre Schleife

Career Development Team: Nick Be

Participating Councilmembers:

Lance Simms, Liam Stanton, Eric Wang, Heather Whitley

LLNL Postdoc Advisory Committee Staff Representatives

Kris Kulp, Christine Zachow